National Aeronautics and Space Administration

2006 NASA Academy
STUDENT HANDBOOK

Office of Higher Education, Mail Code 602
NASA Goddard Space Flight Center
Greenbelt, MD 20771
http://academy.gsfc.nasa.gov/

NASA ACADEMY AT THE
GODDARD SPACE FLIGHT CENTER

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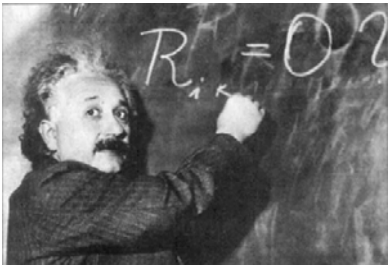
"*It is difficult to say what is impossible, for the dream of yesterday is the hope of today and the reality of tomorrow."*

Robert H. Goddard
(1882-1945)

"*Bear in mind that the wonderful things that you learn in your schools are the work of many generations. All this is put into your hands as your inheritance in order that you may receive it, honor it, add to it, and one day faithfully pass it on to your children...*"



Albert Einstein

(1879 - 1955)

Official NASA Seal

The NASA Vision:

- To improve life here,
- To extend life to there,
- To find life beyond

NASA Mission Statement:

- To understand and protect our home planet
- To explore the Universe and search for life
- To inspire the next generation of explorers

… as only NASA can.

PREFACE

This handbook contains information and guidelines to familiarize you with the NASA Goddard Space Flight Center (GSFC) and the NASA Academy program. It explains the conditions of participation, privileges, and responsibilities of a NASA Academy Research Associate (RA) and procedures observed by the Office of Higher Education in managing the program. Please retain this handbook for reference during your tenure.

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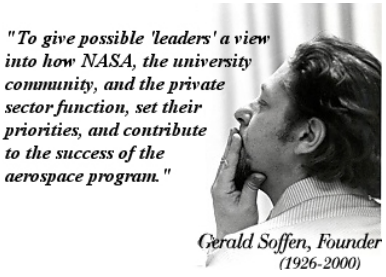
1 INTRODUCTION

1.1 WELCOME

Welcome to the NASA Academy at the Goddard Space Flight Center! As a participant, you join the ranks of distinguished scholars selected in rigorous competition. This will undoubtedly be a unique experience you will remember the rest of your life. You will be offered opportunities that few others, even those within NASA, are privileged to experience. You are urged to contribute to the accomplishments and prestige of the program through the excellence of your work and loyalty to your teammates.

1.2 BRIEF HISTORY



The NASA Academy was founded in 1993 (as the "NASA Space Academy") at the Goddard Space Flight Center by Gerald (Jerry) Soffen, former Mars Viking project scientist, architect of the NASA Astrobiology program, and first Director of the Goddard Office of University Programs. Jerry was an accomplished scientist and dedicated educator. He took advantage of the unusual opportunities presented to him during his career and realized the importance of mentoring in the life of young professionals. In his vision, the Academy was intended to exceed in purpose and content all other internships by familiarizing its participants with as many facets of NASA as possible. With his dynamic personality and unique leadership, he opened many gateways and defined a new standard of excellence.

As the reputation of the Goddard Academy widened, new NASA Academy Programs were started at Marshall Space Flight Center (1994), Ames Research Center (1997), and Dryden Flight Research Center (1997). The name of the program changed from "NASA Space Academy" to "NASA Academy" at specific NASA Centers. A continuous effort is being made to establish or re-establish Academies at various Centers, with different profiles and focus areas. In 2006, NASA Academies will take place at Goddard, Glenn and Marshall.

There have been several international participants in the NASA Academy from England, Canada, Italy and France. The 2006 hosts one Canadian and one French student.

Jerry Soffen died on November 22, 2000. We honor his legacy by continuing the Academy program he loved so well. In 2002, the NASA Academy celebrated ten years of successful activity. To date, 469 participants have graduated from the program.

1.3 ELIGIBILITY, SELECTION CRITERIA, AND PLACEMENT

The 20 participants in the 2006 NASA Goddard Academy have been selected from a highly competitive pool of students representing 41 states in the continental US, Canada and France. Selection was based on the following criteria:

- academic rank (undergraduate junior - second year graduate students)
- academic performance (minimum 3.0 GPA)
- demonstrated interest in space
- demonstrated leadership
- research and/or project experience
- maturity
- recommendations
- citizenship or permanent residence for US applicants

Both the selection process and placement of Academy participants in Goddard's research groups were assisted by recommendations from faculty, administrators, academic supervisors and the applicants' self-profiling essays.

1.4 PROGRAM DESCRIPTION

The NASA Academy is an intensive summer leadership program of higher learning for college undergraduate and graduate students interested in pursuing professional careers in space-related fields.

Designed to present a comprehensive package of information and experiences about NASA, the NASA Academy exposes its students (Research Associates, or RA's) to the agency's most important current

and planned science, engineering, education, and technology enterprises. It also offers training in non-technical areas such as: management, budgeting, safety, personnel and career development, leadership, space law and international cooperation. Besides attending lectures and workshops, RA's are involved in supervised research in GSFC laboratories and participate in visits to NASA Headquarters, various NASA Centers and facilities, the Applied Physics Laboratory, and other space-related academic laboratories and industries.

The NASA Academy at Goddard Space Flight Center is coordinated with the University of Maryland at College Park's College of Computer, Mathematical, and Physical Sciences; the A. James Clark School of Engineering, and the Department of Geography. As such, participants receive Maryland academic credit. The Course Description from the Bulletin of the University of Maryland at College Park reads as follows:

> *Listing: CMPS/ENES/GEOG 496*
> *Grading: (S)atisfactory/(U)nsatisfactory*
> *Course title: NASA Academy*
> *Course description: A ten-week resident summer institute at the NASA Goddard Space Flight Center for juniors, seniors, and first and second year graduate students interested in pursuing professional and leadership careers in aerospace-related fields. The national scholarship program includes research in a Goddard laboratory and a combination of lectures and workshops on the mission, current activities, and management of NASA. Students interested in the Academy will find on-line information at http://www.nasa-academy.nasa.gov. Application should be made before January 31. Sponsorship by an affiliated State Space Consortium is recommended.*

1.5 PROGRAM OBJECTIVES

The objectives of the NASA Academy at GSFC are

- To identify, encourage, and assist future leaders of the aerospace program
- To provide an opportunity for participants to contribute to research in a world-class, space-related laboratory
- To provide a unique, intensive educational training curriculum on NASA; its in-house science and technology projects; its

collaboration with other National centers, industry, and academia; and its extensive technology-transfer programs
- To foster creativity, personal initiative, leadership, teamwork, appreciation for diversity, and professional ethics

1.6 THE NASA ACADEMY ALUMNI ASSOCIATION (NAAA)

Consistent with Jerry's original vision, the Academy experience does not end after the summer program is over. Participants become part of a network of students and aerospace professionals through the NASA Academy Alumni Association (NAAA). Founded in 1998, the NAAA has developed an extensive network of enthusiastic professionals committed to contributing to the space program and providing its members support in their pursuit of space-related careers.

Among NASA Academy alumni are students completing advanced academic degrees, NASA employees and contractors, and other professionals in space-related fields, ranging from science and engineering to education and journalism. Academy alumni are increasingly involved in selection of the Academy participants and strategic development and management of the Academy.

The mission of the NAAA is to:
- Ensure the quality of the NASA Academy programs
- Promote communications, fellowship, camaraderie, and an esprit de corps among all alumni
- Provide a mechanism to facilitate alumni participation in programs and projects that promote NASA and space education, and that communicate the excitement of space exploration and development.

1.7 THE DR. GERALD A. SOFFEN MEMORIAL FUND FOR THE ADVANCEMENT OF SPACE SCIENCE EDUCATION

Throughout his life, Gerald Soffen dedicated himself to fostering the growth of young space scientists and engineers. The Soffen Fund was established to continue Jerry's commitment to the future of space by supporting motivated students in the fields of space science and engineering.

Since the spring of 2002, the Soffen Fund has been providing students pursuing undergraduate or graduate degrees in space-related sciences and engineering with Travel Grants. The Travel Grants will enable awardees to attend professional conferences to present research.

2 MANAGEMENT AND ORGANIZATION

2.1 FINANCIAL SUPPORT

The Academy program is financially supported by the NASA GSFC Office of Higher Education and other NASA and non-NASA organizations. Academy participants are sponsored by the US regional Space Grant Consortia, and the Canadian and French space agencies. Special events have been funded by the NASA Academy Alumni Association and others.

2.2 ORGANIZATION

Chief, Office of Higher Education- *Dr. Vigdor L. Teplitz*

Dr. Teplitz directs the Office of Higher Education and other programs offered by the Office. He joined Goddard at the beginning of 2003 on a three-year leave of absence from the Physics Department of Southern Methodist University. His previous experience includes academic appointments at MIT and Virginia Tech, 12 years in the U.S. Arms Control and Disarmament Agency, and two years in the White House Science Office. His research is in elementary particle theory, primarily at its border with astrophysics and cosmology.

Co-Director, Office of Higher Education- *Dr. Richard P. Fahey*

Dr. Fahey serves as Deputy Chief of the Office of Higher Education. Prior to Dr. Teplitz's arrival, he led the Office of Higher Education as Acting Director for several years both before and after Jerry Soffen's death. For the past three decades, he has been developing methods of presenting aspects of relativity and quantum theory to specialist and non-specialist audiences. During that time, he has taught courses in physics, astronomy, relativity and cosmology, aerospace engineering, and the philosophy of nature. Dr. Fahey currently conducts research in cosmology and gravitational wave detection at GSFC. He is also the Naval Space Command Research Chair at the U.S. Naval Academy in Annapolis.

Program Director - *Mr. David Rosage*

Mr. Rosage (ME) has served NASA in various technical roles between 1980 and 2000, and as Director/Program Manager of the Academy since 2000. Besides managing the NASA Academy Program for Goddard, he is responsible for short and long-term program improvements, expansion

of the Academy to other NASA centers, enabling international participants, and increasing Academy alumni involvement and their awareness to the NASA community.

Dean of Academic Affairs - *Dr. Joseph Di Rienzi*
Joseph Di Rienzi is a Professor of Physics at the College of Notre Dame in Maryland and a Visiting Scientist at NASA/Goddard Space Flight Center's Laboratory of Astronomy and Solar Physics. Dr. Di Rienzi received his Ph.D. in Physics form the Polytechnic Institute of New York and his B.S. from Brooklyn Polytechnic Institute. His research interests are in theoretical physics, in particular atomic physics and the foundations of quantum mechanics. He works at Goddard with Dr. Richard Drachman on theoretical modeling of matter-antimatter reactions, and currently they are investigating the scattering of positronium with helium. Dr. Di Rienzi has had a long association with the NASA Academy. He served under Dr. Soffen as the original Dean in 1993 and 1994. He returned again as the Dean in 1999 and has remained in that position since 2004. Dr. Di Rienzi is a long time member of the Selection Committee, and he is very excited to be part of this year's Academic Staff.

Operations Manager - *Ms. Natacha Chough*
Natacha was in the 2000 NASA Academy at Ames Research Center and staff in 2001. After graduating from the University of Washington in 2001 with a B.S. in Cell & Molecular Biology, she worked at the Jet Propulsion Laboratory, performing Planetary Protection on the Mars Exploration Rovers and supporting their launch preparations at Kennedy Space Center. From 2003 to 2005, Natacha taught health and science as a Peace Corps Volunteer in Turkmenistan. This fall, she will begin medical school at the University of Michigan, planning to specialize in aerospace medicine and serve as a NASA flight surgeon. Natacha is an avid skier and also enjoys running, hiking, traveling, adventure relays, SCUBA diving and skydiving.

Logistics Manager -*Mr. Abraham T. Grindle*
Abe is an alumnus of the 2005 NASA Academy at Goddard. Born and raised in the small town of Bucksport, Maine, his eyes have been drawn to the stars since childhood. Abe graduated from Parks College of Saint Louis University in May of 2006 with an Honors Bachelor of Science degree in Aerospace Engineering. During his undergraduate years, Abe spent more than 16 months working at various NASA centers; he was a

Co-op at Kennedy Space Center from January through August in 2003, a Co-op at the Jet Propulsion Laboratory from January through August of 2004, and finally a NASA Academy Research Associate at GSFC from June through August of 2005. After staffing the Goddard Academy this summer, Abe will spend a year serving with the Jesuit Volunteer Corps at St. Labre's School in rural Ashland, Montana, working with Native American children and exploring his interests in social justice and the outdoors. Following this experience, Abe will continue his education at the Massachusetts Institute of Technology, pursuing dual Master of Science degrees in Technology & Policy and Aeronautics & Astronautics.

Program and IT Support - *Mr. Johnny Erickson*
Johnny has a B.S. in Computer Science and is the co-founder of a software design company. A pillar of the 2002 and 2003 Goddard Academy, Johnny is an enthusiastic and devoted supporter of the Academy and its alumni.

In the operation of the NASA Academy, Natacha, Abe and Johnny will provide general assistance and logistics coordination. Natacha and Abe will reside full time at the Academy House and will be available as facilitators in relevant program activities.

Academy Alumni Coordinator - *Ms. Laura Burns*
Ms. Burns is an alumna of the 1996 Academy at the Marshall Space Flight Center and current President of the NAAA, as well as having served as its Alumni Coordinator since 2000. She currently works at GSFC supporting the James Webb Space Telescope (JWST). As the Alumni Coordinator, Laura informs, recruits, and coordinates alumni participation in all Academy extracurricular activities.

Special Assistant for Operations - *Mrs. Mary Floyd*
Mrs. Floyd provides support for housing, meals, transportation, and lodging on field trips, and distribution of the Academy participants' financial reimbursements.

Together with the designated Academy staff listed above, the Academy participants are expected to be actively involved in the affairs of the Academy, assuring its day-to-day success.

All the members of the Office of Higher Education will be pleased to grant any assistance and support needed.

2.3 ACADEMY PARTICIPANTS (RESEARCH ASSOCIATES)

The 20 participants in the 2006 NASA Academy at Goddard are listed below. Their official title during the Academy session is "Research Associate (RA)."

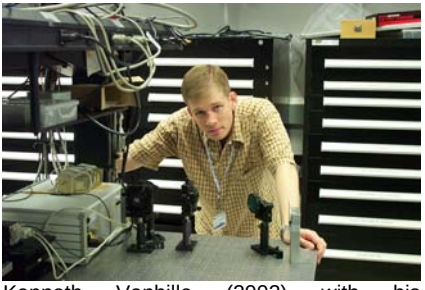
Name	Support/ Space Grant	School	Major	Level
Anderson, Ryan	Michigan	University of Michigan	Astrophysics, Physics	Senior
Baca, Dan	Colorado	University of Colorado-Boulder	Aerospace Engineering	1st Year Masters
Calvo, Daniel	California	University of Southern California	Mechanical Engineering	Sophomore
Davis, Bruce	Pennsylvania	Pennsylvania State University	Aerospace Engineering	Senior
Demaster, Rayna	Minnesota	University of Minnesota	Aerospace Engineering	1st Year Masters
Dickson, McConnell	Massachusetts	Worcester Polytechnic Institute	Aerospace Engineering	Sophomore
Edgar, Lauren	New Hampshire	Dartmouth College	Earth Science Modified with Engineering	Junior
Gabrielse, Christine	Florida	Florida Institute of Technology	Space Sciences	Junior
Hill, Kyle	Canadian Space Agency (CSA)	Mount Allison University	Physics & Mathematics	Senior
Holschuh, Bradley	Massachusetts	MIT	Aerospace Engineering	Junior
Korzun, Ashley	Pennsylvania	University of Maryland-College Park	Aerospace Engineering	Senior
Letor, Romain	Centre National d'Etudes Spatiales (CNES)	École Nationale Supérieure de l'Aéronautique et de l'Espace (Supaero)	Aerospace Engineering	Senior
McMillan, Michelle	Arizona	Northern Arizona University	Physics & Astronomy	Junior
Mycroft, Frank	New Jersey	Princeton University	Aerospace Engineering	Junior
Renkoski, Benjamin	Missouri	University of Missouri-Columbia	Mechanical Engineering	Senior
Russell, Tiffany	Maryland	University of Maryland-College Park	Physics	Senior
Sandberg, Julie	Wyoming	University of Wyoming	Electrical Engineering	Junior
Smith, Lucas	Missouri	Saint Louis University	Aerospace Engineering	Senior
Trujillo, Lady	Florida	University of Florida	Mechanical Engineering, Aerospace Engineering	Senior
Wray, James	New Jersey	Princeton University	Astrophysical Sciences	Senior

Some of the individual and collective responsibilities of Academy participants include

- Working with assigned research supervisors on individual laboratory or field research projects
- Working together on the Group Project
- Attending all Academy functions (lectures, workshops, group meetings, field trips)
- Preparing and delivering Poster and Final Oral Presentations on individual and group project work executed during the Academy
- Creating mini-educational modules in conjunction with their research projects for the Academy website
- Creating weekly written reports of Academy activities
- Creating the Goddard Academy Yearbook
- Creating an original "Logo", "Patch", and "Mascot" for the Goddard Academy
- Sending letters of thanks to speakers and hosts
- Assisting in the operation of the Academy

3 THE ACADEMY PROGRAM

3.1 INDIVIDUAL RESEARCH PROJECT



Kenneth Vanhille (2002) with his experimental setup for testing fiber optical Raman Laser Amplification for remote Sensing Spectroscopy.

To the extent possible, each Academy participant has been placed in a host laboratory or research group that matches the participant's educational interests and background. Details of the assigned work are established in agreement with the research supervisor (Principal Investigator or PI) and may include equipment design and testing, experimental data collection and processing, computer software development and use, field work, etc. Most projects are funded by the Director's Discretionary Fund (DDF) and are at the cutting-edge of science and technology. It is important that you contact your supervisors/PIs prior to arriving at Goddard to obtain brief introductions to project main ideas, literature references, and other information with which to prepare yourself in advance.

3.2 GROUP PROJECT

By communicating with each other before your arrival at Goddard, you will be able to discuss the selection of a project that will engage the interest and talents of all the participants. Further guidelines of the Project will be described during the first week of the Academy. After this, you will be free to creatively develop the project as a team to the extent that time and financial constraints will permit. Consultation with a Goddard mentor will be available as needed.

Group project work (2002)

3.3 LECTURE/WORKSHOP CURRICULUM

The Lecture/Workshop curriculum of the NASA Goddard Academy contains topics related to:

- The NASA Vision for Space Exploration
- Upcoming Landmark NASA Projects
- The NASA Budget
- Space Commercialization
- Space Policies, Space Law, and International Issues
- Leadership
- Outreach and Workforce Development ("as only NASA can")

Meeting with Astronaut Dr. Shannon Lucid at NASA Headquarters (2002)

3.4 AFTER-DINNER GUEST PRESENTATIONS

Regular weekday evening events will be scheduled at the Academy house. Distinguished speakers will attend the dinners and give after-dinner presentations related to their work and contributions to the space program, or personal experiences along their education and career development path. Past visitors at the House have included NASA Headquarters officials, scientists from various colleges and universities, and Academy alumni and past staff members. Some time slots have been reserved for the Academy to invite speakers at their own discretion.

3.5 SITE VISITS

A number of site visits will be organized to important offices, laboratories, and space-related companies. Past visits have included

- NASA Headquarters
- NASA Langley Research Center (LaRC)

- NASA Goddard Wallops Flight Facility (WFF)
- NASA Glenn Research Center (GRC)
- NASA Johnson Space Center (JSC)
- NASA Marshall Space Flight Center (MSFC)
- Orbital Sciences Corporation
- The Johns Hopkins University Applied Physics Laboratory (APL)
- University of Maryland Space Systems Laboratory

Mr. Sean O'Keefe, NASA Administrator, Astronaut Jim Voss, and the 2002 Goddard Academy during a U.S. Senate Hearing

3.6 LEARNING OPPORTUNITIES OUTSIDE THE NASA ACADEMY

- Scientific and Engineering Colloquia at various locations, often in Buildings 3 or 8 Auditoria.
- Occasional Lecture Series on specific topics, usually open to all NASA employees, the press, and/or the general public. Often, lectures are in conjunction with informal receptions, giving attendants the opportunity to speak with featured guests and other participants. There are also lecture series planned for GSFC interns.
- Seminars held in various Branches or Laboratories
- Brown Bag Meetings, Scheduled by Office of Higher Education staff for all OHE Interns; a series of lunchtime talks given by guest speakers in an informal setting.
- Poster Sessions, featuring the progress of various GSFC projects, for the information and benefit of all Goddard interested

employees. Usually, these events are held in the Building 28 atrium.

- The GSFC Library of books and periodicals currently provides loan services and access to extensive on-line resources. At your request, you will be issued a Library Card to check out materials for up to two weeks.

3.7 ADDITIONAL EXTRACURRICULAR ACTIVITIES

The following are some of the interesting, fun, and group bonding activities, many of which have become Academy traditions:

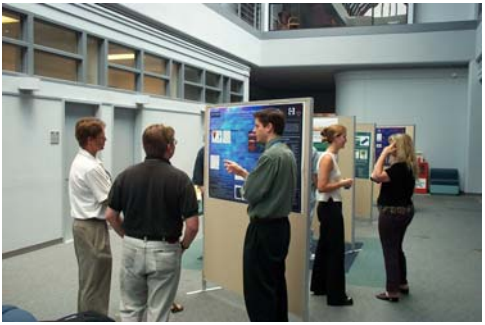
Fourth of July Celebration at the Washington Monument in Washington, DC (2002).

- Weekend visit to home of Mrs. Kazuko Soffen, wife of the late Jerry Soffen
- Weekend visit to Washington, DC museums and monuments
- "Stargazing" excursion with Dr. Jim Crawford from Pennsylvania State University
- Weekend white-water rafting on the Youghigoheny River
- Weekend spelunking in the Laurel Caverns
- Cookout at home of Mr. Al Diaz (Former NASA Goddard Center Director) and Angela Diaz (NASA Official at HQ)
- Cookout with local NASA Academy alumni
- Weekend visit with Academy families - NASA Goddard picnic

If possible, bring a digital camera. You will collect pictures for your own scrapbooks, and also contribute to documenting the Academy activities. Selected pictures will be included in the weekly on-line reports and, if you choose to create one, the Academy Yearbook.

3.8 POSTER SESSION

The Academy Poster Session will take place in the atrium of Building 28. You are expected to demonstrate familiarity with your assigned



Poster Presentation in the Atrium of Building 28 (2002).

research work and present the progress achieved up to date. You are also expected to explain the basic ideas and the experimental set-up of the projects, as well as your contribution to the work. The informal professional interactions with those attending the Poster Session can be extremely beneficial. Take full advantage of this opportunity. Distribute your business cards and collect cards from the attendees. These may be valuable professional contacts to be used in your future educational and employment-seeking efforts.

3.9 OUTREACH/PIPELINE EVENTS

These events give the Academy an opportunity to interact with university, high school and middle school students. The Academy will talk to students as a group and individually, with the goal of inspiring them in the area of space flight, math and sciences, and perhaps even establishing a "pen pal" for post Academy interaction. The community service projects allow the Academy to donate its time towards a good cause while gaining teamwork skills.

3.10 FAMILY WEEKEND

Participants' family members are invited to attend a special Saturday morning tour of the Center followed by an afternoon barbeque, model rocket launch, and other recreational activities at the Goddard Recreational Center, where the posters from the Poster Session will be on display. Sunday is reserved for you and your family members to spend the day together.

3.11 FINAL PRESENTATION SESSION AND GRADUATION CEREMONY

The last day of the Academy session will be important and festive. It will represent your graduation day. A full-day NASA Academy Final Presentation Session will be organized, and the general audience is expected to include the participants' supervisors and co-workers, other GSFC scientists and engineers, representatives of the GSFC administration, NASA Academy staff, and NASA Academy alumni.

The 2002 Goddard Academy at the NASA Headquarters in Washington, DC.

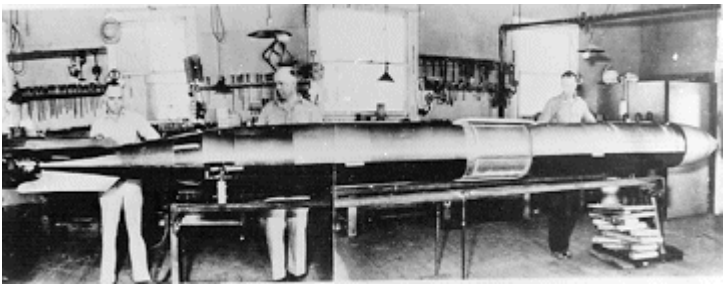
Special invitations will be sent to representatives of NASA Headquarters, GSFC Senior Scientists, and external experts who have interacted with the participants. At the conclusion of the Final Presentation Session, you will be officially inducted into the NASA Academy Alumni Association.

4 THE NASA GODDARD SPACE FLIGHT CENTER

4.1 THE NASA GODDARD SPACE FLIGHT CENTER (NASA-GSFC)

The NASA Goddard Space Flight Center (GSFC) was established on January 15, 1959 and named in honor of Robert H. Goddard, the American rocket research pioneer. The first 157 Goddard employees were recruited from the defense Vanguard project and were transferred to NASA from the Naval Research Laboratory in Washington, DC. At present, the Center has 50 buildings on 1121 acres of land. It supports over 11,000 employees (civil servants and contractors) working on projects spanning from Earth observation to design of satellites and space probes, studies of the distant universe, search for life in space, dissemination of science data to international collaborating communities, and education of future generations of space professionals. Today, NASA-GSFC has in its inventory assets in excess of 3.5 billion dollars, with six distinct appropriations in Human Space Flight (HSF), Science, Aeronautics and Technology (SAT), Mission Support (MS), Office of the Inspector General (OIG), and the Science, Space and Technology Education Trust Fund.

Robert H. Goddard with his first rocket (1932).



Construction of Robert H. Goddard's rocket used in the flight of April 19, 1932.

The 2001 Goddard Annual Report defines the vision, mission, and values of the Center as follows:

The Vision: *We revolutionize knowledge of the Earth and the Universe through scientific discovery from space to enhance life on Earth.*

The Mission:

- *Goddard Space Flight Center enables discovery through leadership in Earth and Space Science.*
- *We serve the scientific community, inspire the Nation, foster education, and stimulate economic growth.*
- *We partner with others to achieve NASA goals.*
- *We accomplish this through innovation in all we do.*

The Values:

- *Agility... in a dynamic environment ...*
- *Balance... of work life and personal life ...*
- *Creativity*
- *Dedication ..., a commitment to excellence and to individual and team responsibilities*
- *Integrity*
- *Respect ...diversity among people and their ideas ...*
- *Teamwork*

4.2 THE NASA-GSFC GROUNDS AND IMPORTANT BUILDINGS

GSFC is a campus-like facility. An aerial view is shown on the next page and a schematic map is included in Appendix VI of this Handbook. Notice that all the buildings are numbered and that successive numbers are not assigned to adjacent buildings (buildings were numbered in the order in which they were built).

Building 29 houses the largest clean room of its class in the world.

Aerial view of the NASA Goddard Space Flight Center

On the afternoon of your first work day (Orientation Day), you will be given a guided tour of the Center. Also that afternoon, the Goddard scientists who will be your individual research supervisors will escort you to your labs and show you the building(s) and room(s) where you will be performing your research work. Other important buildings you may frequently visit are listed below:

Building 1 - Goddard Employees Welfare Association (GEWA) Exchange Store, cafeteria, Ticket Master, US Postal Sub-Station, ATM Machine

Building 3 - Auditorium

Building 8 - NASA-GSFC Administration, Director's Office, Graphics Department, Auditorium, Public Affairs Office

Building 9 - Security

Building 21 - Main cafeteria, Library, NASA Federal Credit Union, ATM Machine

Building 28 - NASA Academy Offices/Office of Higher Education

Building 88 - Visitors' Center, Gift Shop (outside the GSFC ground boundaries. Entrance is from Soil Conservation Road)

4.3 TRANSPORTATION

As a rule, during the Academy, participants will travel in groups, using University of Maryland buses, government vehicles, rented vans, the Metro, commercial airplanes or, occasionally, personal vehicles. Daily transportation from the Academy house to GSFC will be provided by a University of Maryland bus. Maps of the DC Metro system are available at all Metro stations. In exceptional cases, individual Academy participants may use the local urban Metrobus system. Metrobus schedules are available at the GEWA store (Bldg 1). Bus T16 provides connections to the Green line Greenbelt Metro terminal near Beltway Plaza Mall, and the Orange line terminal at New Carrolton station. The Academy residence House is located a few minutes walking distance from the College Park Metro Station (on the Green line). The T17 and T15 buses supplement the T16 route during rush hours. Buses generally stop at the Goddard Main Gate once every hour and more frequently during rush hours.

4.4 YOUR IMAGE AND DRESS

As NASA Academy participants, you represent the Academy and NASA. Remember that your actions can affect (positively or negatively) the reputation of the Academy as a whole. It is expected that you make a positive impression on NASA workers, administrators, scientists, visiting personalities, and other interns you meet. To optimize the professional contacts you will make as Academy Research Associates, you will be issued a number of business cards.

Regarding the dress code for on-site at Goddard, casual but appropriate wear is generally allowed during laboratory research work. On visits to NASA Headquarters and various commercial or academic sites, or when delivering formal presentations, business attire is required. This means that both males and females should wear suits. In certain work environments, appropriate protective clothing may be mandatory.

4.5 SECURITY PERMITS AND BADGES

You should be aware at all times that GSFC is a federal facility governed by mandatory security rules and procedures which may change, depending on specific domestic and/or international circumstances. All GSFC entrance gates are guarded by armed security personnel. Vehicles may be stopped for thorough visual inspection and metal-detector searching.

The GSFC Security Office (located in Building 9, at the Main Gate on Greenbelt Road) will issue you temporary security badges, which you should wear in plain view at all times, when entering the Center, while you are within Center perimeters, and also on official Academy field trips. You should also have a picture ID with you at all times.

You will also receive a NASA Academy badge, which you may want to wear together with your security badge. The NASA Academy badge will identify you as a NASA Academy Research Associate, but can never be used as a substitute for your official security badge.

Sometimes, security personnel may execute routine checks within the GSFC premises, especially after regular day-time hours. If you have misplaced your badge or unknowingly lost it, you should explain who you are and be cleared over the phone by the Academy Program Manager.

Loss of your GSFC security badge is a serious matter. You should notify the Academy staff immediately, and they in turn will report the incident properly.

4.6 TRAFFIC

The speed limit within Goddard is 25 mi/hr on roads and 15 mi/hr when approaching gates and parking areas.

Yield to pedestrians (and geese or deer ...) at all times.

Parking at GSFC is allowed only in designated spaces. No parking permits are required on-Center.

5 LIVING ACCOMMODATIONS

5.1 THE "HOUSE"

Housing for the Academy continues a tradition started in 1995. In order to create a group environment and receive more efficient services, the Academy participants stay in houses on Fraternity Row on the University of Maryland, College Park (UMCP) campus. Located about five miles from GSFC, the beautiful UMCP campus area is an ideal setting for the Academy's off-hours recreational activities.

The Goddard NASA Academy Residence House (2004)

The large residence houses have three floors and a basement. The common rooms (dining room, kitchen, living/TV room, study room, and computer room) are located on the first floor and in the basement. All bedrooms are on the second and third floors. Each bedroom floor contains one bathroom facility with two or three showers, toilet stalls, and sinks. Women and men have separate bathroom facilities. Bedrooms are designed for double and triple occupancy. Roommates will be assigned by Academy staff. Each participant will have a bed, desk, chair, dresser and closet. Single-room occupancies are not available. Consumption of alcohol, use of illegal drugs and smoking are not permitted.

5.2 LINEN SERVICE AND LAUNDRY FACILITIES

Sheets, pillows, blankets, and towels will NOT be provided. Each participant should bring at least two flat sheets, one pillow-and-pillowcase set, one blanket, and two towels. The laundry room, consisting of two washers and two dryers, is located in the basement of the house. There is a fee of $1.00 per use of the laundry machines.

5.3 MEAL INFORMATION

In-house dinner meals will be provided by a contracted catering company three nights per week. Access to the house kitchen is not available. There is, however, access to a refrigerator, microwave and sink. The Academy staff will arrange for periodic trips to grocery stores.

5.4 HOUSE CLEANING

A contracted professional cleaning company will service the house twice a week. The cleaning person will vacuum and dust the common areas of the house (basement, first floor, and the hallways and bathrooms of the second and third floors). The cleaning person will NOT clean the bedrooms or kitchen area.

5.5 WORKING AT THE HOUSE

After-dinner guest presentations and group meetings will take place in the living/TV room or basement. The basement is also used for meals, individual study or Group Project work. Public computers will be set up in the house for any students to share. When Academy events are scheduled at the House, it is important that you adhere to basic rules of punctuality, courtesy, and appropriate behavior.

Working in the basement of the Academy Residence House (2002)

A limited number of computer stations (equipped with a networked printer and basic software such as MS-Word, Excel, PowerPoint, etc.) will be available in the house. You are encouraged to bring your own laptop computer. The staff plan to install a wireless internet router for the

house. Use of computer facilities is unlimited, provided that it does not disturb scheduled group activities or resting time of Academy members.

5.6 MAIL

You can temporarily receive personal mail at the Houses, from June 5th to August 12, 2006, at the following address:

Your Name
#X Fraternity Row
College Park, MD 20740

5.7 TELEPHONE

As of this printing, there is no access to a house landline. You are encouraged to bring a cell phone. If you bring and want to use your own cellular phones, you are requested to observe common-sense rules of courtesy compatible with living in the organized group environment of the NASA Academy.

6 OTHER LOGISTIC ITEMS

6.1 ROOM AND BOARD

Housing for all NASA Academy participants is provided free-of-charge by the NASA Academy. Meals will either be paid through your Academy stipend or provided. You will receive several "per diem" advance checks during the Academy term. These cash advances are to be used for meals during out-of-state travel.

6.2 THE PER DIEM SYSTEM

To cover travel meals and certain pre-approved personal expenses such as mileage, a per diem system has been established in compliance with government regulations.

6.3 SCHEDULE AND CLAMING EXPENSES

As necessary, you should fill out expense reports in order to get reimbursed for any approved expenses. It is particularly important to submit the final claim form before you return home.

6.4 MILEAGE REIMBURSEMENTS

The Academy participants will be reimbursed at standard government rate for any mileage covered while driving their personal vehicles for approved Academy purposes.

6.5 CREDIT UNION

You will have an opportunity to open a personal account with the NASA Federal Credit Union, which is located on the ground floor of Building 21, next to the cafeteria.

7 THE LOCAL URBAN ENVIRONMENT

7.1 SHOPPING

Goddard Space Flight Center is located on Greenbelt Road in the city of Greenbelt. A small strip mall across the street from the Main Gate has a few restaurants, a K-Mart, and a Bank of America. The nearest supermarket is the Safeway located at 7595 Greenbelt Road. You will pass it every day on the way to and from work. There are also other options available on Greenbelt Road.

College Park is a university town where you can find many points of interest and convenient establishments (barbers/hairstylists, restaurants, convenience stores, etc.) a short walking distance from the residence house, most of them along Baltimore Avenue (Route 1). A small strip mall just south of UMCP campus, on Route 1, has a CVS Pharmacy store. A Wawa's convenience store is located across the street from this strip mall.

7.2 PHOTOCOPY SERVICE

A Kinko's, open 24 hours/day, is located behind the CVS in College Park.

7.3 MAILING AND SHIPPING

A UPS Store is located near the UMCP main south gate. You can rent a P.O. Box there, if you choose. There is also a Post Office near the Academy houses and right next to the College Park metro station, as well as a USPS sub-station located in Building 1 on-Center.

7.4 WEATHER

Local temperatures during the summer often pass 90° F (30° C) with high humidity. This can often contribute to intense thunderstorms in the afternoons, so you may want to bring an umbrella.

8 CONDUCT, GRIEVANCES, & GROUNDS FOR DISMISSAL

8.1 CODE OF CONDUCT

All Academy participants and staff shall, at all times, conduct themselves in a manner honorable and respectful toward each other and the institutions with which they interact.

Any form of harassment or discrimination against any of the Academy community, its partners, hosts, or other interns is strictly prohibited and will not be tolerated.

Participants should understand the professional pressures and time constraints faced by their mentors. For NASA scientists and engineers, mentoring is not their primary responsibility; in fact, the time spent with interns can be time taken from their own research.

Participants will inform their mentors in advance, as early as possible, of any schedule changes decided by Academy staff, or unplanned absences due to illness or other unpredicted circumstances.

8.2 GRIEVANCE PROCEDURES

Academy participants are encouraged to raise any concerns involving the Academy community. Grievances should first be discussed with the resident support staff (Ms. Natacha Chough and Mr. Abe Grindle). More serious academic problems should be directed to the Dean of Academic Affairs (Dr. Joseph Di Rienzi), and any other problems to the Program Manager (Mr. David Rosage). Further appropriate action(s) will be taken by the Deputy Chief for the Office of Higher Education (Dr. Richard P. Fahey) and the Chief of Office of Higher Education (Dr. Vigdor Teplitz).

Actions taken will be decided by Academy staff and will range from mediation to dismissal of the Academy participant(s) involved.

Full confidentiality will be respected. Lodging a grievance shall not affect negatively the individual who initiated the grievance event.

8.3 GROUNDS FOR DISMISSAL

The following is a list of disruptions or violations which can lead to dismissal:

- Providing misleading or false information on your application
- Inappropriate use of government facilities
- Actions disruptive to the group during activities or at the houses
- Unprofessional conduct in lab or during group activities (speakers, tours, trips, outreach activities)
- Plagiarism
- Lack of respect for Principal Investigators, staff, speakers, or fellow Research Associates
- Failure to participate in the Group Project
- Failure to complete assigned tasks and deliverables (i.e., poster session, final presentations, speaker thank-you notes)
- Unexcused absences
- Other actions deemed inappropriate or disruptive by Academy staff

Infractions will be documented and may result in disciplinary action up to and including dismissal, in the following order:

1. Oral Warning
2. Written Warning
3. Final written warning and/or disciplinary probation
4. Dismissal

APPENDIX I: IMPRESSIONS OF NASA ACADEMY ALUMNI

"*The Academy is the definition of a full-time experience - if this was the summer you planned on catching up on your reading or exercising four hours a day - forget it! The three most important qualities you need to have are a PASSION for space and the future, a COMMITMENT to the Academy (you must "give yourself to the Academy), and enough CONFIDENCE in yourself to believe you can change the world. Over only ten weeks you will garner more useful, real-world knowledge than you did all through college, meet an incredible number of brilliant and exciting people, and supply yourself with more tools than you could ever use to achieve your highest goals!*"

- Eric A.

"Attending the Academy was one of the most rewarding experiences of my college career, the work is challenging and the friends you make will last a lifetime."

- Jeff A.

"The NASA Academy is a tool for making your dreams into reality. It provides the right framework and opportunities for developing the maturity and gaining the knowledge needed to interact with today's engineers and scientists."

- Rob B.

"*The NASA Academy was a refreshing change after years of classroom and textbook learning. It was all about leadership and learning through interaction. The Academy gave me a renewed sense of enthusiasm for the space program and reminded me about all of the reasons why I chose this field in the first place!*"

- Robin S.

"The NASA Academy is a tool for making your dreams into reality. It provides the right framework and opportunities for developing the maturity and gaining the knowledge needed to interact with today's engineers and scientists."

- Rob B.

"*The NASA Academy was a refreshing change after years of classroom and textbook learning. It was all about leadership and learning through interaction. The Academy gave me a renewed sense of enthusiasm for the space program and reminded me about all of the reasons why I chose this field in the first place!*"

- Robin S.

"*The NASA Academy is a once-in-a-lifetime experience. In a ten week period one learns more about NASA, government and industry relations with NASA, people, and oneself. It is an intense time of learning, experiencing, researching, meeting new people, making life-long friends, and basically having a great time. Not for those who enjoy relaxing, only for those with an intense desire to lead, and to learn about leading.*"

- Todd C.

"*The NASA Academy is a dream-come-true experience, but only for those people seriously interested in the Space Program.*"

- Warren B.

"*NASA Academy is not for people who lack passion about space exploration; nor is it for people who like to relax for extended periods of time. It is challenging, in that one must handle one's research tasks and also keep up with the tightly-scheduled encounters with NASA engineers, scientists, and administrators. If you can keep up with the pace, the rewards of NASA Academy -- research experience, professional development, and a new group of friends and colleagues in the 'space community,' among other things -- are proportional to your efforts.*"

- Mike L.

"*Ever desire to pull the face off your wristwatch or remove the cover from your radio to discover how these devices operate? NASA Academy does this to the space program, and just like seeing the springs of the watch or the circuit boards in the radio, you'll find yourself with familiar and unfamiliar objects that present to you the challenge of understanding how everything works together.*"

- Laura S.

"*My Academy experience was great. The program is for people who are interested in Space, NASA, and space-related industries. You don't have to have planned out your life in the space industry for the next 10 years, including a trip to the Moon or Mars or even be able to recite the entire*

Star Wars trilogy from memory (although one of us this summer did :). What you do need is a bright mind, a true interest in Space, and a passion for working with people. This program is NOT for you if you are strictly interested in research work. There are some other programs at Goddard that do that better. This program IS for you if you are interested in doing some research with one of the best scientists or engineers at Goddard on a cutting-edge project, learning about the structure, policy, and politics of Goddard, NASA, and the space program, and working closely with a bunch of motivated, exciting, and bright people like yourself. Of course, it is quite a fast-paced program. You'll be working with other students from around the country (and the world) on your own projects"

- Grant B.

"*After my experience at NASA's space academy, I was asked to apply my new knowledge to Utah State University's space design class as a systems engineer. I met my wife in that class. A couple of years later, the professor for that class recommended me for a job as a spacecraft systems engineer, which I accepted.*"

- Mark W.

"*The Academy gives you an in depth look at how NASA operates without hiding anything. As a result, you get to see both the strong points and the weak points of NASA. With this knowledge, it is possible for you to start thinking about what needs to be continued and what needs to be changed. I believe this is very important because if you do not understand the dynamics of a system you can not apply control to it.*"

- Jose G.

"*SPACE. Suspended effortlessly looking at your mother planet. Your chest feels compressed, your eyes water, as you stand humbly in awe before the greatest and most beautiful sight you have ever seen: Planet Earth. The whole of blue mother Earth. Waltzing with you in the presence of millions of stars, across the greatest of ballrooms... SPACE.*"

- Enectali F.

"*The summer that I spent attending the first NASA Academy was one of the most rewarding times of my life. More than anything, the Academy is a learning experience. From my interaction with the program, I learned not only about NASA, but how science and technology relate to society*

on broader scales, and how important it is that we keep the flame of exploration burning bright and hot."

- Matt L.

"*This program is truly more than it is billed to be. I feel it has provided me with the tools to begin my long journey as a future leader in our space program and help me meet some incredible people that I will be working with along the way.*" - Ran

APPENDIX II: USEFUL INTERNET RESOURCES

- The NASA Academy:
  http://www.nasa-academy.nasa.gov/

- The NASA Academy Alumni Association:
  http://www.nasa-academy.org/

- NASA:
  http://www.nasa.gov/

- International Space University:
  http://www.isunet.edu/

- The Soffen Memorial Fund
  http://www.nasa-academy.org/soffen/donors.html

- Goddard Space Flight Center
  http://www.gsfc.nasa.gov/

- Goddard Space Flight Center's Mission
  http://www.gsfc.nasa.gov/about_mission.html

- Office of Higher Education
  http://university.gsfc.nasa.gov/

APPENDIX III: USEFUL CONTACTS

NASA Goddard Academy and Office of Higher Education Personnel (in alphabetic order):

Mablelene Burrell
University Program Specialist
Office of Higher Education, Code 603
Building 28, Room N157
NASA-GSFC
Greenbelt Road, MD 20771
Tel: 301-286-1122
FAX: 301-286-1610
E-mail: Mablelene.S.Burrell@nasa.gov

Adrienne Byrd
Program Specialist, EduTech Ltd.
Office of Higher Education, Code 602
Building 28, Room N163
NASA-GSFC
Greenbelt Road, MD 20771
Tel: 301-286-1089
FAX: 301-286-1610
E-mail: abyrd@pop100.gsfc.nasa.gov

Natacha Chough
Operations Manager, NASA Academy
Office of Higher Education, Code 602
Building 28, Room N190
NASA-GSFC
Work: 301-286-0093
FAX: 301-286-1610
E-mail: nchough@pop600.gsfc.nasa.gov

Ron Cook, Sr.
Program Specialist, EduTech Ltd.
Office of Higher Education, Code 602
Building 28, Room N163
NASA-GSFC
Greenbelt Road, MD 20771
Tel: 301-286-8733
FAX: 301-286-1610
E-mail: rcook@pop100.gsfc.nasa.gov

Dr. Joseph DiRienzi
Dean of Academic Affairs, NASA Academy
Special Assistant for Research and Outreach
Office of Higher Education, Code 602
Building 28, Room N196
Tel: 301-286-0451
FAX: 301-286-1610
E-mail: JDiRienzi@ndm.edu

Johnny Erickson
Program and IT Support, EduTech Ltd.
Office of Higher Education, Code 602
Building 28, Room N190
Tel: 301-286-8760
FAX: 301-286-1610
E-mail: jerickso@pop100.gsfc.nasa.gov

Dr. Richard P. Fahey
Program Co-Director, NASA Academy
Office of Higher Education, Code 602
Building 28, Room N155
Tel: 301-286-9690
FAX: 301-286-1610
E-mail: Dick.Fahey@nasa.gov

Abe Grindle
Logistics Manager, NASA Academy
Office of Higher Education, Code 602
Building 28, Room N190
NASA-GSFC
Work: 301-286-0093
FAX: 301-286-1610
E-mail: grindlea@gmail.com

Mr. David Rosage
Program Manager, NASA Academy
Office of Higher Education, Earth Science Directorate
Building 28, Room N159
Tel: 301-286-0904
FAX: 301-286-1610
E-mail: David.J.Rosage@nasa.gov

Dr. Vigdor Teplitz
Chief
Office of Higher Education
Building 28, Room N155
Tel: 301-286-9877

FAX: 301-286-1610
E-mail: Vigdor.L.Teplitz@nasa.gov

APPENDIX IV: THINGS TO BRING CHECK LIST

Notes:

- Bring one to two sets of formal clothes (suits, multiple shirts, ties, skirts, etc.).
- Some functions will be business-casual dress; also, some labs / offices may be business-casual. (Other labs/offices might be more relaxed.) Pack with this in mind.
- You will want to bring old clothes for outdoor activities. The clothes worn on the caving trip may be ruined. (There is a thrift store within walking distance from the houses.)
- Be prepared to leave with a lot more than you brought. Most airlines will only let you check two bags, so you may have some shipping charges.

Necessary Clothing and Linen

- formal outfit, at least one (suits, ties, dresses)
- casual business outfit, a few
- clothes for lab work (varies by lab)
- hot weather clothes (shorts, short sleeve shirts, etc.)
- "going-out" clothes
- casual clothing
- old clothes (pants, shirt, shoes, jacket, and an old pair of shoes)
- bathing suit
- walking shoes, at least one pair
- hiking boots or shoes
- water shoes (for the whitewater rafting trip)
- two towels
- two flat sheets, one pillow and pillowcase, one blanket

Other Necessary Items

- student ID
- driver's license/passport/other official ID
- Social Security Card or copy of it
- money (cash, checks, credit cards, bank cards)
- toiletries

Things You'll Need, But May Want to Buy Here

- laundry basket/bag

- detergent
- sunscreen
- postage supplies
- hangers (usually the closets don't have hangers, but there is ample drawer space)

Consider Bringing:

- reference books related to your field and/or lab work
- book bag
- laptop computer (with 802.11g card)**** This will make things very convenient
- cell phone
- digital camera
- camera, film, and batteries
- umbrella
- sunglasses
- hat
- beach towel
- Walkman/Discman/MP3 player/portable stereo
- musical instrument
- sports equipment (baseball/softball equipment, soccer ball, Frisbee, ball pump, volleyball net)

Things You Do Not Need to Bring

- portable refrigerators/microwaves
- desktop computers

APPENDIX V: DIRECTIONS TO THE ACADEMY HOUSE

#8 and #9 Fraternity Row
College Park, MD 20740

From Baltimore and Points North

- Take I-95 South to Washington, D.C.'s Capital Beltway (I-495).
- Take Exit 27 and then follow signs to Exit 25 (U.S. 1 South toward College Park).
- Proceed approximately two miles south on U.S. Route 1.
- Turn left onto College Ave
- Turn left at the first stop sign (Yale Ave)
- Go straight into the fraternity row parking lot and park in the K5 lot.

From Virginia and Points South

- Take I-95 North to Washington, D.C.'s Capital Beltway (I-495).
- Continue North on I-95/I-495 toward Baltimore.
- Take Exit 25 (U.S. 1 South toward College Park).
- Proceed approximately two miles south on U.S. Route 1.
- Turn left onto College Ave
- Turn left at the first stop sign (Yale Ave)
- Go straight into the fraternity row parking lot and park in the K5 lot.

From Virginia and Points West

- Take I-66 East *or* I-270 South to Washington, D.C.'s Capital Beltway (I-495).
- Go East on I-495 toward Baltimore/Silver Spring.
- Take Exit 25 (U.S. 1 South toward College Park).
- Proceed approximately two miles south on U.S. Route 1.
- Turn left onto College Ave
- Turn left at the first stop sign (Yale Ave)
- Go straight into the fraternity row parking lot and park in the K5 lot.

From Annapolis and Points East

- Take U.S. 50 to Washington, D.C.'s Capital Beltway (I-495).
- Go North on I-95/I-495 toward Baltimore.
- Take Exit 25 (U.S. 1 South toward College Park).
- Proceed approximately two miles south on U.S. Route 1.
- Turn left onto College Ave
- Turn left at the first stop sign (Yale Ave)
- Go straight into the fraternity row parking lot and park in the K5 lot.

From Washington, D.C. (Northwest/Southwest)

- Take 16th St. North which becomes Georgia Ave. North at Maryland/D.C. line.
- Go East on I-495 toward Baltimore.
- Take Exit 25 (U.S. 1 South toward College Park).
- Proceed approximately two miles south on U.S. Route 1.
- Turn left onto College Ave.
- Turn left at the first stop sign (Yale Ave)
- Go straight into the fraternity row parking lot and park in the K5 lot.

From Washington, D.C. (Northeast/Southeast)

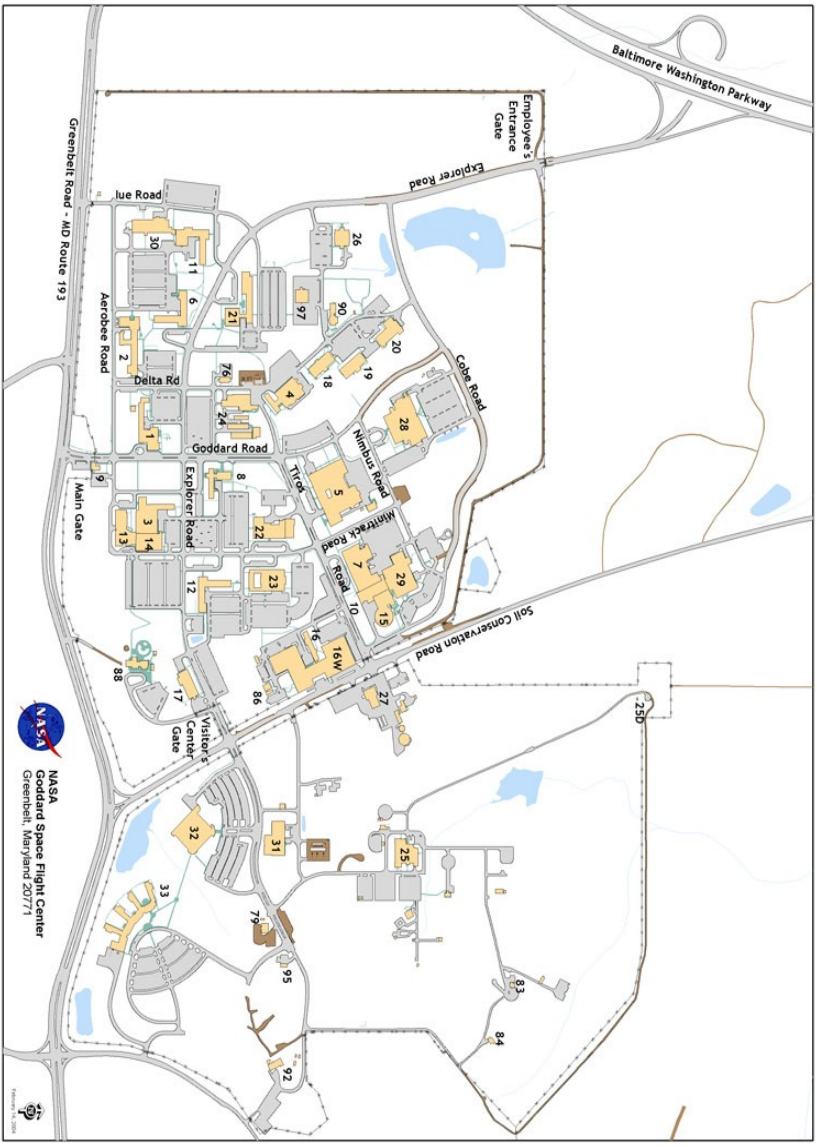
- Take Rhode Island Ave. (U.S. 1 North) which becomes Baltimore Ave. North at Maryland/D.C. line.
- Proceed into the city of College Park.
- Turn right onto College Ave
- Turn left at the first stop sign (Yale Ave)

- Go straight into the fraternity row parking lot and park in the K5 lot.

Walking Directions from the College Park Metro Station

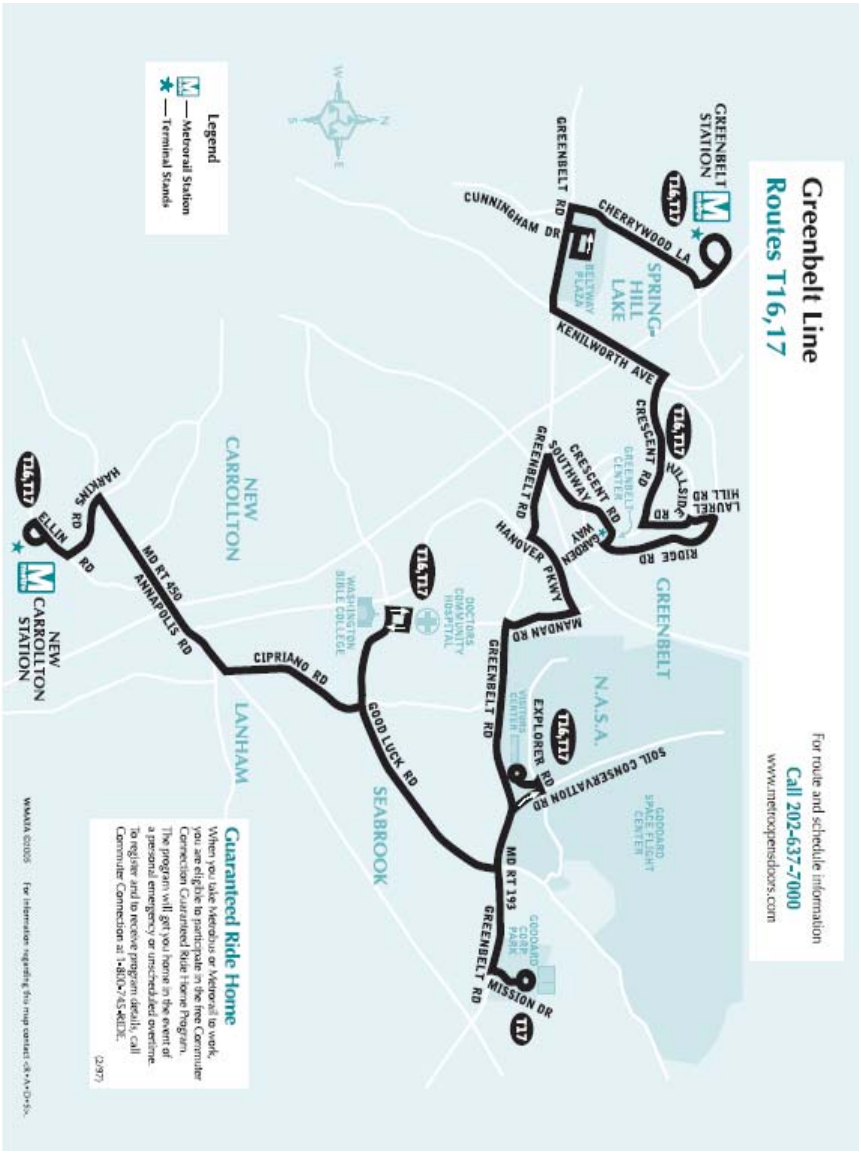
- Get off the train, come down the escalator and when you exit through the fare card machines turn right, walk through the tunnel and exit on the college park side.
- Walk straight and you will be on Calvert Ave
- Walk 7 short blocks and make a right on Yale Ave
- Go straight into the fraternity row parking lot.

APPENDIX VI: GODDARD SPACE FLIGHT CENTER MAP



APPENDIX VII: METRO SYSTEM MAP

APPENDIX VII: METROBUS GREENBELT LINE RT T16, T17



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1. NOTES